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Approved For Release 2004/11/30 : CIA-RDP78B04770A000300040005-1

NPIC/D-81-67  
17 April 1967

MEMORANDUM FOR: Deputy Director for Intelligence

SUBJECT: Request for Approval of Advanced Light Table Prototype  
Contract with [ ] for  
[ ] from FY 1967 Funding

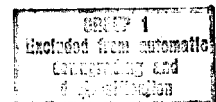
REFERENCE: Chief, Administrative Staff, O/DDI Memorandum dated  
4 February 1964: "Approval of Research and  
Development Activities."

1. The Advanced Light Table Prototype project is a 6-month effort to produce the prototype of an improved light table for general use by imagery interpreters.

2. The [ ] Model 918 Light Table, which has been in use at the NPIC for many years, is one of the standard image interpretation tools, with over 175 of them in use throughout the Center. However, during recent years, significant shortcomings in this instrument have come to light. Also, larger scale photography has come into use, calling for better quality tables, and there have been important related technological advances, such as improved lighting systems. The major deficiencies in the present model are unsatisfactory illumination and an awkward, manual system for winding film.

3. As the first step toward developing a modern light table, two improved tables were developed simultaneously by competitive contractors. The resulting devices were evaluated and the best features of each were selected for inclusion in this advanced prototype. The table developed by [ ] was generally superior, and the proposed prototype will essentially be a simpler, smaller, lighter, and less expensive refinement of that model. Among the features selected from the competitive [ ] design is the excellent illumination system. Because of their performance in the development of their first improved table, [ ] was selected as contractor for the advanced prototype. Three months will be required for design, and three additional months will be spent on fabrication. The delivered prototype will then be tested and evaluated, and a decision will be made whether to seek further improvement or to begin production of the new table.

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Contract with [REDACTED]  
from FY 1967 Funding

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4. NPIC's work on this project has been made known to the intelligence community through the Committee on Photographic Exploitation (COPE). Further, informal, coordination was carried out with the Naval Reconnaissance and Technical Support Center (NRTSC).

5. I recommend that this project be approved at a funding level of [REDACTED] for a 6-month development effort by [REDACTED]  
[REDACTED]

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ARTHUR C. LUNDAHL  
Director

National Photographic Interpretation Center

Attachments:

1. Catalog Form
2. Proposal

APPROVED:

\_\_\_\_\_  
R. J. SMITH  
Deputy Director for Intelligence

\_\_\_\_\_  
Date

Distribution:

- Original and 1 - NPIC/SS/LB (after approval) with attachments  
1 - DDI with att 1  
2 - NPIC/ODir with att 1  
1 - NPIC/TDS/DS with att 1

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(When Filled In)

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17 April 1967

1. PROJECT TITLE/CODE NAME Advanced Light Table Prototype		2. SHORT PROJECT DESCRIPTION A related project covering the refinement and further development of three advanced light tables.	
3. CONTRACTOR NAME		4. LOCATION OF CONTRACTOR	
5. CLASS OF CONTRACTOR Manufacturer		6. TYPE OF CONTRACT	
7. FUNDS		8. REQUISITION NO.	9. BUDGET PROJECT NO. NP-V-3-02037
FY 1966	\$	10. EFFECTIVE CONTRACT DATE (Begin - end) May 1967 - Nov 1967	11. SECURITY CLASS. A.A. - Confidential T. - Unclassified W. - Unclassified
FY 1967	\$		
FY 1968	\$ None		
12. RESPONSIBLE DIRECTORATE/OFFICE/PROJECT OFFICER TELEPHONE EXTENSION DDI/NPIC/TDS/			
13. REQUIREMENT/AUTHORITY Existing light tables, the basic instrument for virtually all image interpretation, are awkward to use, mechanically inefficient, and provide inadequate illumination. The vast amount and high quality of present and future reconnaissance imagery requires the development of an improved table.			
14. TYPE OF WORK TO BE DONE Engineering Development			
15. CATEGORIES OF EFFORT			
MAJOR CATEGORY Viewing Systems		SUB-CATEGORIES Light Sources	
16. END ITEM OR SERVICES FROM THIS CONTRACT/IMPROVEMENT OVER CURRENT SYSTEM, EQUIPMENT, ETC. A prototype model of an advanced film-viewing light table, monthly progress reports, and operation and maintenance manuals.			
17. SUPPORTING OR RELATED CONTRACTS (Agency & Other)/COORDINATION Two previous NPIC concurrent contracts have produced competitive prototype models of this advanced light table. Thorough evaluation provides specifications for an optimized model, incorporating the advantages of each. No equivalent device exists or is under development elsewhere.			
18. DESCRIPTION OF INTELLIGENCE REQUIREMENT AND DETAILED TECHNICAL DESCRIPTION OF PROJECT (Continue on additional page if required) An optimized prototype based on the best features of the two experimental prototypes will be produced. The greatest improvement will be in the film transport and lighting systems. After further evaluation, the prototype or an improved version of it will be put into production to replace existing light tables.			
19. APPROVED BY AND DATE			
OFFICE	DEPUTY DIRECTOR		DDCI

FORM 11-64 2338

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GROUP 1  
Excluded from automatic  
downgrading and  
declassification

(1-13)

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B-Pre Cont

28 February 1967

DESIGN OBJECTIVES -- ADVANCED LIGHT TABLE PROTOTYPE1. INTRODUCTION:

These development objectives describe the requirements to be met in designing and fabricating an Advanced Light Table Prototype; the pre-production prototype of an advanced Model of the PI, 9 X 18-inch light table which will incorporate the best design features of the [ ] 603 and [ ] Tilt Top Light Table engineering prototypes developed under previous contracts.

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2. CONCEPT:

The Advanced Light Table will provide ease of viewing, increased illumination, easy loading and a superior film transport system. It is to be as light-weight, compact and simple in mechanical design as is possible within the parameters imposed by the specific requirements stated in these objectives.

3. GENERAL DESCRIPTION:

The table will employ the design of the [ ] Tilting Light Table Model 603 as a basis from which changes will be made. The new table will be lighter, quieter, and have a better illumination system than the present 603; the major change, however, being a effort toward the reduction of mass, complexity and cost.

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4. REQUIREMENTS:

4.1. The "Development Objectives for an Advanced Tilt Top Light Table" contain the general requirements to which the [ ] Model 603 light table was built. These requirements still hold (except as noted below) for this new table.

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4.2. The general design and features of the new prototype shall be the same as those of the Model 603 Light Table except for improvements and changes listed in these Design Objectives.

4.3. Illumination

4.3.1. The illumination system shall be the same as that in the [ ] Advanced Light Table Prototype Model 1 or equivalent. This illumination source far exceeds the requirements listed in the earlier specifications for range and variability. The lamp and power supply drawings will be included with these design objectives.

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25X1 4.3.2. The diffuser used with the [ ] illumination system is made of 1/8" [ ] Lucite Number 2447. It is recommended that this same type of diffuser be used in the new prototype. 25X1

25X1 4.3.3. The Potentiometer used for controlling the intensity of the light in the [ ] table is No. 3-205-1-502 produced by [ ] 25X1  
25X1 [ ] This same type of potentiometer should be used in the new light table.

4.3.4. Only one light shade will be required on the new prototype. This shade will be capable of extending from the back (the side opposite the control panel edge) to within 70 mm of the front of the viewing area.

#### 4.4. Film Transport

4.4.1. Only two modes of operation are required on the new prototype, manual and fully automatic, the power assist mode found on the present Model 603 is not required.

4.4.2. The manual mode shall have only the one gear ratio, 1:1 or an optimum compromise.

4.4.3. The requirement for handling and transporting two rolls of film simultaneously is deleted from the new light tables. Only the transporting of one roll of film of variable widths need be considered. Thus, the driving sprockets toward the control panel edge of the table can remain fixed and leave the idler sprockets to be adjustable.

4.4.4. The automatic mode shall be comprised of (a) drive motor(s) which shall be controlled by a single knob giving varying speed in either direction and a detent in the center for stop. The speed range will be from 0 to 300 ft/mm. (If necessary, two potentiometer ranges, high and low, can be used with a range selection switch to give good control at both low and high speeds). The motors must have enough torque to transport 500' reels of 9 1/2" film at the desired speeds.

4.4.5. The adjustable tension rollers on the 603 will not be required on the new prototype. The weight of the film keeps the film close to the glass surface regardless of the position of the tensioning rollers.

#### 4.5. Controls

The following controls will be needed on the prototype.

4.5.1. The Power Switch should be placed in or close to the center of the control panel with the pilot light adjacent to it. The switch should be unique in appearance when compared to other controls on the panel.

4.5.2. The Automatic Film Transport control should be on the left of the control panel so that it may be easily reached by the operator regardless of the operating position of the table. The knob should be large enough that it can be found easily by touch. There should be a definite detent for the null position between the forward and reverse ranges. If the speed range selection switch is used it should be adjacent to speed control knob.

4.5.3. The three position (high, neutral, low) gear controls on the right and left of the Model 603's control panel will not be required.

4.5.4. The three position coupling control found on the 603 will not be required.

4.5.5. The brightness control and loading switch on the 603 are acceptable as are the side shade controls.

4.5.6. The control selector, and power assist switches found on the 603 will not be needed.

4.5.7. The film drive handwheels could be improved by changing the knob to a larger size (one that could be gripped in the palm of the hand rather than just by the fingers), otherwise the 603 designed handwheels and interlock switches are completely acceptable.

4.5.8. Other controls not mentioned in these design objectives which are found on the Model 603 can be assumed to be required on the new prototype.

#### 4.6. Tilt Mechanism

The tilting feature design of the Model 603 is acceptable with the exception of the drive. The Motor Drive is too noisy for operational use. Either a relatively quiet manual handwheel or ratchet drive or else a much quieter motor driven system will be required in the new light table.

#### 4.7. General Requirements

4.7.1. The weight of new light table must be reduced considerably from the weight of the 603 Light Table. A total weight of 60 pounds or less is the goal. This type of light table is often used in pairs and placed on the   TE 2140 elevating tables. These light tables are also frequently moved, therefore, the overall size and weight should be such that one man could move a light table unassisted and place two light tables upon one TE 2140 table. The possibility of using nylon or other light weight material gears and lighter motors should be looked into provided there is no decrease in reliability, as well as using lighter structure construction methods and materials.

4.7.2. The overall dimensions of the table should also be reduced from the size of the 603 accompanying the cut back on the options, for example, the tension rollers will be replaced by fixed rollers which can be set lower.

4.7.3. On the 603 Light Table there are exposed gears at either end below the film reels. These gears must be covered or eliminated in the new table.

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**CONFIDENTIAL**

15 February 1968  
Ref: LJC 1007

Post Office Box 6788  
Fort Davis Station  
Washington, D.C. 20020

Attention:   
Contracting Officer

Subject: Request for Proposal No. RD-14-68  
Project No. 02037

Reference: Our letter Ref: LJC 1001, dated 5 February 1968

Dear Sir:

Enclosed herewith please find Addendum to our Technical Proposal for an Advanced Light Table Prototype, which was originally transmitted to you under our above-referenced letter. This Addendum was the result of a meticulous review of the weight tabulation after the Proposal was written. By taking each item and removing all possible overage, we have accumulated a weight saving of approximately 15 pounds. This was considered of sufficient significance to warrant this Addendum. With this new total weight of 79.52 pounds, it is our contention that every effort has been made to meet the design goal of 60 pounds. This does not, in any way, change the Cost Quotation submitted. The prices as quoted will remain the same.

We appreciate the opportunity of preparing this information for the original Proposal. If clarification is required or more details are needed, please feel free to contact the undersigned.

Very truly yours,

cc  
encls.

Systems

3cc letter & encls. to:

"This Document contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794, the transmission or revelation of its contents in any manner to an unauthorized person is prohibited by law."

**CONFIDENTIAL**

EXCLUDED FROM AUTOMATIC  
DECLASSIFICATION: DOD DIR 5200.1  
DOES NOT APPLY

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PROPOSAL NO. ED-CG-73, REVISION 1

ADVANCED LIGHT TABLE

PROTOTYPE

ADDENDUM NO. 1

(S.I. 240, 241)

12 February 1968

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Proposal No. ED-CG-73, Rev. 1  
12 February 1968

ADDENDUM NO. 1

ADVANCED LIGHT TABLE PROTOTYPE

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This addendum to [ ] Proposal No. ED-CG-73, for the Advanced Light Table Prototype is submitted to present further analysis conducted by [ ] with respect to realizing the design objective weight of 60 pounds.

The following revised Weight Estimate tabulations show a total reduction of 14.83 pounds, thus reducing the originally estimated weight from 94.35 pounds to 79.52 pounds.

The description of each specific weight saving is noted on the appropriate tabulation sheet. There is some additional cost associated with these changes but this is considered as being insignificant and would not require any re-estimating.

TABLE 2-1  
WEIGHT ESTIMATE - REVISED  
BASE ASSEMBLY

Item No.	Description	No. Req'd	Weight
1.	Base - Casting	1	7.0
2.	Shaft Index	1	1.1
3.	Shaft - Tilt	1	0.4
4.	Yoke - Tilt	1	1.4
5.	Plate - Motor - Tilt	1	0.3
6.	Pin Lock - Index	1	0.6
7.	Spring Lock - Index	1	0.26
8.	Cover	1	0.8
9.	Bracket Switch	1	0.01
10.	Bracket - Limit Switch	1	0.01
11.	Bracket - Mount Bearing (Tilt)	1	0.4
12.	*Motor - Tilt, Bodine B-2170-40H (Ref. 1)	1	6.25
13.	Worm Wheel, Boston G1051	1	0.7
14.	Worm, Boston H1056	1	0.2
15.	Bearing - Tilt	4	1.0
16.	Gear - Tilt, Boston YB12	1	0.3

-5.75lb

\* Ref. 1:

Bodine B-2170-40H is a 1/18 HP Series Wound Universal AC or DC motor in NSE-12RH type frame and provides 11.2 lb.-in. torque at 125 rpm vs. the 21 lb.-in. torque at 57 rpm for the originally specified B-3808-30 in the NCI-33R frame. An additional 2:1 gear pass will equalize the performance.

Proposal No. ED-CG-73, Rev. 1  
12 February 1968

TABLE 2-1  
- continued -  
WEIGHT ESTIMATE - REVISED  
BASE ASSEMBLY

Item No.	Description	No Req'd	Weight
17.	Gear - Tilt, Boston YB32	1	0.7
18.	Coupling	1	0.2
19.	Limit Switch SM 1 Micro	2	0.01
20.	Connector	2	0.5
21.	* Power Supply - Light Source (Ref. 2)	1	13.0 - 2 lbs.
22.	Amplifier - Film Drive	1	4.5
23.	Relay	3	0.37
24.	Switch Toggle - Tilt Mech.	1	0.1
			(- 7.75)

Revised TOTAL WEIGHT = 40.11lbs.

\* Ref. 2:

By packaging the power supply in an aluminum can and filling with aluminum powder, a smaller mass of iron can be utilized for the same performance. This takes care of the higher temperature, by providing not only better heat sink capability, but also minimizes transformer hum.

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TABLE 2-2

WEIGHT ESTIMATE - REVISEDLIGHT SOURCE AND MAIN HOUSING ASSEMBLY

Item No.	Description - Fabricated Items	No. Req'd.	Weight	
1.	* Main Housing - Cast (Ref. 3)	1	10.5	-1.5 lbs.
2.	* Glass - Top (Ref. 4)	1	3.75	-1.25 lbs.
3.	Diffusing	1	.7	
4.	Shade	1	.4	
5.	* Roller - Shade (Ref. 5)	1	.9	- .6 lbs.
6.	Shaft - Shade	1	.3	
7.	Shaft - Shade Drive	1	.1	
8.	Shaft - Shade Drive	1	.1	
9.	Panel - Control	1	.3	
10.	Panel - Control	1	.3	
11.	Rod - Shade	1	.15	
12.	* Spacer - Glass (Ref. 6)	2	.4	- .4 lbs.
13.	Retainer - Glass	1	.4	
14.	Cover - Manual Belting	1	.3	
15.	Cover	2	.1	

\*Ref. 3: By using 1/8" thick walls instead of 3/16" (more difficult to cast due to slower flowing and faster cooling).

\*Ref. 4: By using 3/16" thick tempered glass instead of 1/4".

\*Ref. 5: By using larger tubing O. D. and thinner wall for same effective stiffness.

\*Ref. 6: By using plastic instead of metal.

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Proposal No. ED-CG-73, Rev.1  
12 February 1968

TABLE 2-2

-continued-

WEIGHT ESTIMATE - REVISED  
LIGHT SOURCE AND MAIN HOUSING ASSEMBLY

Item No.	Description	No. Req'd.	Weight	
16.	* Pulley - Shade (Ref. 7)	6	.5	-.5 lbs.
17.	Belt - Timing	3	.1	
18.	Bearing	6	.1	
19.	Switch - Toggle	4	.4	
20.	Pot - Intensity - Light	1	.2	
21.	Aristo Grid Light & Terminals	1	1.2	
22.	Knob	2	.1	
23.	Tachometers	2	.4	
			" (-4.25)	
Revised Total Weight =			21.70 lbs.	

\*Ref. 7:

By using plastic instead of metal.

TABLE 2-3

WEIGHT ESTIMATE - REVISEDMANUAL AND POWERED FILM DRIVE COMPONENTS

Item No.	Description	No. Req'd	Weight	
1.	Film Torquer Housing Cover	2	0.7	
2.	Spindle - Film Drive	2	.3	
3.	Sensing Arms	2	.15	
4.	Cover Torquer	2	.10	
5.	Drive Shaft - Torquer	2	.4	
6.	*Metering - Roller (Ref. 8)	2	1.0	-.6 lbs.
7.	Shaft Metering Roller	2	.06	
8.	MTG. Plate -	2	.2	
9.	Bracket - Hand Drive	1	.4	
10.	Shaft - Support	1	.6	
11.	*GIB - Film Spool (Ref. 9)	2	.67	-1.33 lbs.
12.	*Bracket ADS Film Spool (Ref. 10)	2	.9	-.5 lbs.
13.	*Housing Clutch (Ref. 10)	1	.8	-.4 lbs.
14.	Shaft - Hand Crank	1	.01	
15.	Shaft - Hand Crank	1	.06	

\*Ref. 8: By using larger O. D. tubing and thinner wall for same effective stiffness.

\*Ref. 9: By using electrolyzing (hard coating) on aluminum instead of hardened steel.

\*Ref. 10: By making magnesium casting instead of aluminum.



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12 February 1968

TABLE 2-3  
WEIGHT ESTIMATE - REVISED

MANUAL AND POWERED FILM DRIVE COMPONENTS

Item No.	Description	No. Req'd.	Weight
16.	Gear - Sector - Sensing Arm	2	.004
17.	Roller - Sensing Arm	2	.002
18.	Shaft - Pivot Sensing Arm	2	.004
19.	Spindle - Film Drive	2	.4
20.	Spring - Film Drive	2	.2
21.	Misc. Hardware	Misc.	.7
	PURCHASED ITEMS		
22.	Torquer - Film Drive T5403 Inland Motor	2	2.3
23.	Bearing - Torquer Film Drive	6	1.2
24.	(Barden) D.C.- Bearing- Manual Drive E2-9, C3.84	12	.5
25.	Gear Clutch G7-120	7	1.9
26.	Gear - Pot G11-32	2	.1
27.	Gear - Pot G12-130	2	.2
28.	Gear - Tach	2	.1
29.	Gear - Tach G12-120	2	.2
30.	Pulley - Hand Crank	6	1.8

Proposal No. ED-CG-73, Rev. 1  
12 February 1968

TABLE 2-3

WEIGHT ESTIMATE - REVISEDMANUAL AND POWERED FILM DRIVE COMPONENTS

Item No.	Description	No. Req'd	Weight
31.	Belt - Timing Belt Manual Drive	6	.5
32.	Crank Wheel	3	.6
33.	Clutch Electroid Corp. REC - 26CC	2	.2
34.	Potentiometer Sensing	2	.2
35.	Potentiometer - Trim Film D PB	2	.05
36.	Elect. Connector	2	.2
	Revised SUB TOTAL Wt.	=	17.71 (-2.83 lbs.
Revised TOTAL ESTIMATED WEIGHT OF			
	PROTOTYPE:	=	79.52 lbs.